The Impact of Cornet Shoemaker-Levy 9 with Jupiter

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Beginning with software developed for Earth approaching objects. we investigated the probability of a Jupiter impact by comet Shoemaker-Levy 9 in July 1994. Whereas we could find no significant probability of an Earth impact with an asteroid or comet in the next 200 years. the probability was close to certainty for a cometary impact with Jupiter in July 1994. Using a combination of linearized covariance techniques and Monte Carlo analyses, the uncertainties have been investigated for the cometary impact times and locations on Jupiter. and the viewing conditions from Earth and the Galileo spacecraft. As seen from the impact point. the Galileo spacecraft will be 21-25 degrees above the local horizon for the various fragments and thus in an excellent position to observe the impact events directly. All of the large fragments will impact Jupiter on the night side at mid-southern latitudes. just behind the Jimb as seen from Earth. The Jovicentric latitudes at impact range from -43.3 degrees for the first fragment (A) to -44.2 for the last fragment (W) with a one sigma uncertainty of 0.6 degrees. The corresponding range in the Earth-Jupiter-Fragment angle is 99 to 94 degrees with an uncertainty of 1.7 degrees and the range in the longitude angle between Jupiter midnight and the point of impact is 64 to 70 degrees (±2.5 degrees). Hence, the last fragment will impact Jupiter closest to the morning terminator. For each fragment, the July 1994 impact times in U.T. are given below (light-time corrected, uncertain by 0.03 days):

Fragment	Impact Time	Fragment	Impact Time
A	16.81	N	20.41
B	17.11	P	20.62
C	17.27	Q	20.80
D	17.48	R	21.28
E	17.62	S	21.62
F	18.02	T	21.75
G	18.31	U	21.88
H	18.77	V	22.18
K	19.43	W	22.32
L	19.90		

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